

## National 5

### Homework RE3

1. Solve each of these pairs of simultaneous linear equations:

(a)  $2x + y = 3$   
 $4x - y = 9$

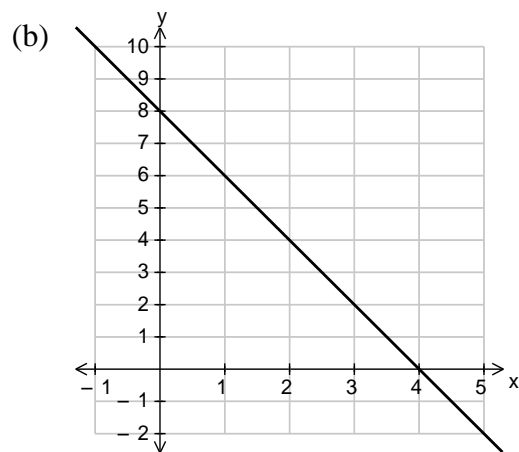
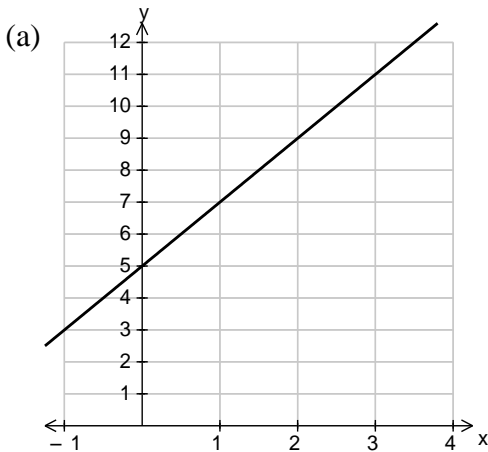
(b)  $3x + 2y = 12$   
 $4x - 3y = -1$

(c)  $3x + 4y = 1$   
 $5x - 2y = -7$

(d)  $5x + 3y = 1$   
 $3x - 2y = 12$

2. Find the coordinates of the point of intersection of the straight lines with equations  $2x + y = 5$  and  $x - 3y = 6$ .

3. Find the equation of each of these straight lines.

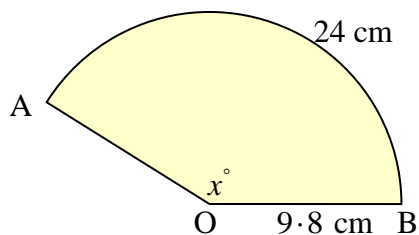


4. A tank contains 150 litres of water.  
The water is pumped out at a constant rate of 30 litres per minute.

(a) Draw an accurate graph of the volume  $V$ , of water in the tank against the time  $t$ , in minutes.

(b) Find an equation for  $V$  in terms of  $t$ .

5. The length of the arc AB in the diagram below is 24 cm.  
Find the size of the angle AOB.



6. Solve each of the following equations. No decimals.

(a)  $3x - 5 = 2(1 - 2x)$

(b)  $3 - 2a = 5a + 3$

(c)  $(x + 1)^2 = (x - 3)(x - 4)$

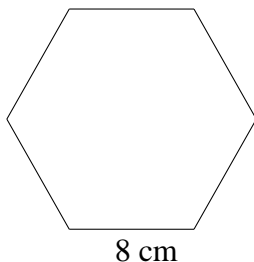
(d)  $\frac{2}{3}x = 7$

7. Solve each of the following inequalities. No decimals.

(a)  $5x - 3 \geq 17$

(b)  $4(2x + 3) > 1 - 2x$

8. The regular hexagon sketched below has sides of length 8 cm. Calculate its area.



9. Simplify each of these fractions.

(a)  $\frac{15x^3}{10x}$

(b)  $\frac{(x+3)^4}{(x+3)^5}$

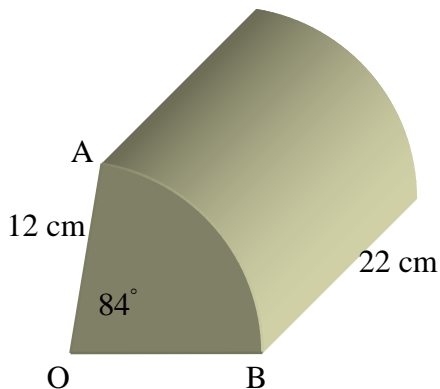
(c)  $\frac{1}{x} + \frac{1}{x^2}$

(d)  $\frac{3}{y} \div \frac{1}{y^2}$

(e)  $\frac{3pq}{4} \times \frac{2}{p^2}$

(f)  $\frac{4}{a} - \frac{3}{b}$

10. The cross-section of the prism sketched below is a sector of a circle of radius 12 cm. The prism has length 22 cm and  $\angle AOB = 84^\circ$ . Calculate the volume of the prism, correct to three significant figures.



11. Cylinder A has volume  $100\text{ cm}^3$ . Cylinder B has twice the radius and half the height of A. Calculate the volume of cylinder B.

